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ABSTRACT

This paper summarizes the details of a workshop which sought to bring together researchers, practitioners, policymakers, and university educators to consider the current state of knowledge about emergent and early literacy learning, with the overarching question: what additional knowledge is needed about early literacy learning? Six specific topic areas were addressed: (1) Meeting Context, Background, and New Frontiers; (2) Emergent Literacy and Prevention; (3) Emergent Literacy and Identification of Risk Factors; (4) Emergent Literacy and Intervention; (5) Summary and Conclusions; and (6) Research Agenda and Suggestions for Practice. Common themes addressed in the workshop were: converging findings and research gaps in emergent and early literacy; practical concerns that influence research design and implementation in investigations of emergent and early literacy; and implications for individuals working in different professional roles and disciplines. The workshop also considered the influence of parents and caregivers in enhancing literacy skills, and it sought to identify processes that could assist families in implementing literacy activities and identifying whether their children might be at risk in literacy development. (EF)

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EMERGENT AND EARLY LITERACY WORKSHOP: CURRENT STATUS AND RESEARCH DIRECTIONS

Bethesda, Maryland
September 21-23, 2000

This workshop sought to bring together researchers, practitioners, policy makers, and university educators to consider the current state of knowledge about emergent and early literacy learning in all young children, including those with disabilities and other literacy learning risks. The goal of the workshop was to discuss the gaps in current knowledge and to inform the national direction of literacy research and practice.

This meeting was jointly sponsored by the National Institute of Child Health and Human Development (NICHD), the National Institute on Deafness and Other Communication Disorders (NIDCD), and the Office of Behavioral and Social Sciences Research (OBSSR) at the National Institutes of Health; the Office of Special Education Programs (OSEP), the National Early Childhood Institute (NECI), the Office of Educational Research and Improvement (OERI), and the Office of Bilingual Education and Minority Languages Affairs (OBEMLA) at the Department of Education; and the American Speech-Language-Hearing Association (ASHA).

In addition to specific topics, each speaker was asked to address the following common themes:

- Converging findings and research gaps in emergent and early literacy;
- Practical concerns that influence research design and implementation in investigations of emergent and early literacy; and
- Implications for individuals working in different professional roles and disciplines.

There was an overarching question for the workshop: what additional knowledge is needed about early literacy learning? That is, what literacy instructional practices work for different professionals and families at specific developmental stages, times, conditions, settings, and at particular levels of intensity and duration? In addition, speakers were asked to consider the influence of parents and other caregivers in enhancing emergent and early literacy skills in children, including processes that could assist families in recognizing and implementing literacy-enhancing activities and in identifying whether their children might be at risk for problems with literacy development.

I. MEETING CONTEXT, BACKGROUND, AND NEW FRONTIERS

A. Dr. Reid Lyon, NICHD

Dr. Lyon of the NICHD set the context for the meeting with his opening remarks. He noted that reading problems are not confined or defined by intelligence, race, or ethnicity. Children with reading problems will have problems in life. Thus, literacy is not just an educational issue, but a

public health issue, as there are many downstream sequelae of reading problems in an individual's life.

It is important to start this discussion from the premise that the vast majority of children **can** be taught to read. In the last 15 years, progress has been made on the developmental skills that prepare children to learn to read and that identify children with reading problems as different. Currently, many children are identified with learning problems only when they are in kindergarten or the primary grades. It is important to identify children who are at-risk for or who have reading difficulties earlier in their development.

Researchers can identify and measure the social, cultural, environmental, experiential, and neurobiological issues that children bring to learning. As we develop interventions, we need to consider both how they affect children and how they can be translated into best practice. There is a need for multidisciplinary work; there is a need for researchers and other professionals, paraprofessionals, and families to collaborate across terminologies and approaches developed by the individual disciplines. Faculty and graduate students need to be trained or retrained to work as members of multidisciplinary teams and to communicate and collaborate. Researchers need to develop "gold standards" for the various approaches that are used for these investigations.

Early childhood educators and preschool caregivers who can facilitate multidisciplinary exchanges and implement new practices may approach this issue from narrow methodological perspectives; further, they may have insufficient knowledge about how children learn to read. It is important to marshall the resources necessary to ensure that all early childhood professionals and paraprofessionals have a working knowledge of the most effective practices for preparing young children for successful reading. This result can be accomplished through the availability of quality preservice and continuing education programs.

B. Dr. Kenneth Pugh, Yale University School of Medicine and Haskins Laboratories

Dr. Pugh described the use of neuroimaging as a new tool to help characterize and understand neurodevelopmental disorders by contrasting the functional organization of the brain in impaired with that of non-impaired populations. Cognitive deficits that manifest themselves in behavioral performance likely reflect atypical organization in neural systems associated with these cognitive operations. Dr. Pugh explained that he uses research that combines functional magnetic resonance imaging (fMRI) and intensive behavioral testing to explore the functional organization of the brain for language in reading-impaired and non-impaired populations. During tasks that make explicit demands on phonological assembly, both adults and children with reading impairments demonstrate anomalous activity at both dorsal and ventral posterior regions in the left hemisphere. In addition, these populations also show what appears to be a compensatory reliance on frontal lobe and right hemisphere posterior systems during the same tasks. Importantly, two other neuroimaging technologies have yielded similar results, thus enhancing the validity of these findings.

These types of imaging studies can be extended into longitudinal studies with children and adolescents, to examine the developmental factors associated with atypical brain activation patterns related to reading skills. Intervention studies involving pre- and post-training imaging may aid in determining how intensive phonological remediation affects brain activation patterns

in reading-impaired children. Thus, the studies could facilitate the development of interventions and the understanding of their underlying neurobiological bases. The validity of the results from such studies will depend upon the cognitive theory underlying the studies and on the experimental design.

C. Dr. David Dickinson, Education Development Center, Newton, MA
Dr. Dickinson discussed insights into literacy precursors that have been provided by researchers from multiple disciplines over the past three decades. He reported on the growing awareness that the preschool years have an important impact on a child's later academic success. Understanding the contributions of environmental factors on developing linguistic and cognitive abilities provides the opportunity for developing strategies that facilitate children's long-term literacy success.

Longitudinal studies, such as the Home-School Study of Language and Literacy Development, have measured language and literacy development. Investigators started with a model for the development of precursor skills, hypothesizing that for preschool children the home and child-care settings are the environments in which children will develop their underlying literacy skills. These skills include conversation, language skills in general, print skills, phonemic awareness, broad vocabulary, and extended discourse. Careful analysis of data from the homes and classrooms of low-income children has revealed that these skills are affected by home experiences as well as by classroom experiences. Preschool and kindergarten classrooms have important and long-lasting effects on children, with contributing factors including the nature of teacher-child and child-child discourse as well as the opportunities teachers provide for children to hear and discuss books, to be engaged in varied and interesting content, and to write.

During the preschool years, children develop language skills that are prerequisite to their later schooling success; therefore, preschool skill acquisition and the quality of children's later reading instruction both help determine their long-term ability to learn to read with comprehension. The results from these and other longitudinal studies suggest that there is not a simple one-to-one relationship between experiences and capacity. Rather, the home and school environments overlap in contributing to the development of preschool vocabulary and discourse skills, and to children's understanding of print. Each can help compensate for weaknesses in the other.

There is a need for additional research in several areas: examination of interdependent cognitive and linguistic capacities and developmental mechanisms at different points of a child's life; dispositional factors and their possible interactions with cognitive and linguistic functions; and interventions to reduce the achievement gap. It is crucial that design considerations also include feasibility for later use on a large scale.

II. EMERGENT LITERACY AND PREVENTION

A. Dr. Grover Whitehurst, State University of New York, Stony Brook
Dr. Whitehurst noted that in the U.S., 40 million adults and eight million children have difficulties reading. There is a strong Socio-Economic Status (SES) effect: in many affluent

school districts, less than 10 percent of fourth grade children will be reading below grade level, whereas in inner-city systems, up to 70 percent of children in the fourth grade may be reading below grade level. Dyslexia accounts for only a small number of the children with reading problems in these low-performing districts. Moreover, there is stability in reading performance from kindergarten through high school; early problems appear to persist and need to be addressed promptly. Clearly, understanding the early bases for literacy is important for assuring that all persons learn to read.

There are two approaches to studying these issues. First, the naturalistic approach involves more descriptive methods; it focuses on how children absorb a literate environment and what their responses are to this environment. Often, the methods used by the naturalists do not clearly discriminate between emergent literacy behaviors that are important for later reading and those that are not. The functionalistic approach, on the other hand, takes reading in elementary school as the outcome and searches through correlational or intervention studies for early predictors of reading success. Functionalists focus on reading at the decoding level and word level as outcomes; however, reading is more than decoding, it includes comprehension. Future studies in the functionalistic tradition will require both word level and comprehension level outcome measures.

Researchers should keep in mind that outcomes will vary depending on the environment. Children who are learning in an effective environment with an individualized curriculum have less variation in outcome from their emergent literacy experiences and skills than children who are subjected to more problematic teaching.

Reading is a system that is dependent on multiple variables; these variables need to be captured in a better way. Simple correlational studies should be augmented with more sophisticated, multivariate methods, and by incorporating intervention studies that examine interactions between treatment and educational settings into which children transition subsequent to treatment.

B. Dr. Elizabeth Sulzby, University of Michigan

Dr. Sulzby defined emergent literacy as the time between birth and when a child becomes a conventional reader; it encompasses reading and writing concepts and behaviors that precede conventional literacy. There are three aspects that need to come together in conventional reading: letter sound knowledge (phonics), the concept of a word, and comprehension/ understanding of written language. When children begin to read conventionally, they are able to use all three aspects in a flexible and coordinated way to interpret text.

Few schools are currently using research-based practices or making data-based decisions in teaching reading. Teachers cannot apply research findings without organizational and professional support; further, they need opportunities to acquire a deeper understanding of the aspects of reading in order to apply new methods and interventions. A careful assessment of the costs, techniques and tools for training teachers to apply these concepts should be a top priority. Tools currently under development to measure results in terms of children's reading outcomes are promising, but more measures are needed to assess comprehension, composition, and phonemic awareness at various stages of development.

C. Dr. Anne van Kleeck, University of Georgia

Dr. van Kleeck presented two models she has developed: one details the myriad factors at work in fostering preliteracy development; the other details the various areas of knowledge children acquire that will later contribute to the process of becoming literate. The first model considers the child and the environmental factors that are believed to influence preliteracy development, including parent and home influences, culture and societal influences, child factors, and preschool and early education influences. For middle-class, majority children, parent and home influences mirror those found in preschool and early education, including teaching strategies, language interactions, attitudes, and literacy activities and artifacts. For children of other cultural groups, the parental and home influences need more study. The second model considers the areas of knowledge a preschooler is potentially acquiring that will contribute to later literacy development by listing those related to a context processor, a meaning processor, a phonological processor, and an orthographic processor. The numerous skills developed by the preliterate child related to each of these processors are identifiable and need more study.

D. Dr. Josefina Tinajero, University of Texas at El Paso

Dr. Tinajero stated that currently, there are about 4.1 million children in the U.S. with limited English proficiency and that the number is increasing. Developing literacy skills in this population is an important issue. Much of the debate surrounding the development of literacy skills in children with bilingual and/or multicultural backgrounds has focused on whether or not those immersed in English will fare better than those initially taught in their native language. The debate typically has focused on political rather than pedagogical issues. We must address the literacy of non-English speaking children in the context of their linguistic and cultural backgrounds.

There are several factors to consider in identifying and strengthening the learning environments and approaches for children who are learning English as a second language. Home and family interaction are important assets in developing literacy skills in children with bilingual and/or multicultural backgrounds. These children benefit when parents read to their children in the home language, and when schools and libraries have ample supplies of books in a variety of languages. It is important to recognize that learning begins very early in life, perhaps as early as the child pays attention to the mother's voice while still in utero. For children with bilingual or multicultural backgrounds, the process begins with a different set of sounds and rhythms, a different set of grammatical constructs, and a different vocabulary. Preschool environments must build on the child's home language, background knowledge, and cultural background in order to succeed in promoting literacy development. Some studies suggest that the fastest route to English literacy is through literacy in the home language.

E. Dr. Julie Washington, University of Michigan

Dr. Washington addressed the development of literacy skills for young African American children. Children who are poor, African American, and educated in urban schools are reportedly at greatest risk for poor reading outcomes. The complex interaction between poverty and cultural-linguistic differences, as well as possible differences in learning styles, is often offered as a possible explanation for lower outcomes. However, in recent years, it has become clearer that because poor reading outcomes also occur in African American children from middle-income homes, this problem is not simply an artifact of poverty.

The gaps seen on standardized assessment measures seem to be characterized primarily by difficulty in reading achievement; most are apparently present prior to entry into kindergarten. African American children entering preschool appear to have language skills and important early literacy skills that are significantly below those of many of their peers. There is also a need to develop precursor literacy skills such as language, book knowledge, and interpersonal skills. These findings suggests that programs to ameliorate or prevent early reading difficulties must begin prior to school entry and should involve the community and family in important ways.

A study in Detroit demonstrated that language skills increase when teachers are aware of and focus on language development in the classroom. Analyses revealed that perception of dialect has changed. Initially, the use of dialect was seen as an impediment to learning; however, recent studies have shown that the use of a heritage language can support learning and reading more complex materials. It is important that the development of both assessment and instructional methods take into consideration characteristics of the child's dialect. For example, educators now recognize that measuring skills such as rhyming needs to take into account the impact of dialect on words/sounds that are perceived to rhyme.

III. EMERGENT LITERACY AND IDENTIFICATION OF RISK FACTORS

A. Dr. Hugh Catts, University of Kansas

In introducing this session, Dr. Catts noted that early identification has become an important topic in reading disabilities. Most educators agree that it is much harder to remediate than to prevent reading problems. Reading disabilities persist for long periods of time; even students who improve with intervention may not become fluent readers.

However, early identification is a complex issue. Numerous factors contribute to reading achievement, including cognitive/linguistic development and early literacy experiences. Literacy is a multifaceted activity involving word recognition, fluency, comprehension, writing and spelling. Predictive factors may change with age. Therefore, early identification may include multiple outcomes and multiple predictive factors at various ages.

There are a number of problems related to early identification. Typically, identification occurs in kindergarten or first grade, which is relatively "late" in the language acquisition, pre-literacy process. Even then, there is a high (40 to 50 percent) false-positive rate. Additionally, there are limited data on reading skill acquisition in diverse populations of children. Further, there is limited transfer of research results to school practice, partly due to the lack of available research-based intervention programs, and partly due to the lack of inclusion of research information in teacher pre-service and in-service professional development. While these situations are beginning to change in the training of elementary school teachers, there is no uniform skill level required on certification for those caring for preschool children. This heightens the challenge of identifying children at risk for or with reading difficulties.

B. Dr. Froma Roth, University of Maryland

Dr. Roth indicated that a child's oral language skills in preschool may be the best predictor of literacy outcomes. Early identification and intervention are critical if more children are to become successful readers in elementary school because two-thirds of the developmental disabilities identified in children involve problems of oral language. Different language skills may be important indicators of different literacy tasks, which means certain language skills may be predictive of literacy problems at one age or developmental stage but not at another. Most early identification studies and methods have focused on expressive language skills, but have not addressed language comprehension or have not separated the two. Few findings have been documented in more than one study; differences in measurement may be one source of incongruent findings. Thes studies should consider factors other than language, including SES, parental education, home literacy environment, language spoken in the home, and cultural context. Applying research to practice is complex. Group difference data are highly valuable; what is needed now are measures that predict outcomes for individual children. It also is important to determine when a statistical difference is educationally meaningful. Finally, there is a need for professionals who can cross content areas.

Dr. Roth indicated five important challenges in the identification of children at risk for problems in literacy development: increased attention to receptive in addition to expressive language in the identification process; more uniform methodologies across studies to allow meaningful comparisons and the accumulation of a larger database on the issues of identification; exploration of factors other than language in the identification process, e.g., IQ, family literacy, and socioeconomic status; careful consideration of cultural factors, and studying children of diverse cultural and linguistic backgrounds; and meaningful translation of research finding to instructional and clinical settings.

C. Dr. Mabel Rice, University of Kansas

Dr. Rice noted that young children with language impairment are at risk for reading impairments. In a longitudinal study of children with grammatical language impairment, the impairment persisted well into the elementary grades. While these children do learn and progress, they do not close the gap with their peers. If reading, rather than grammar, is tracked, the same observation is made; the children gain, but don't close the gap between themselves and their age peers. Language is an important skill for children entering school and plays an essential role in establishing friendships; teachers expect preschool children to have these skills.

Additional research is needed in several areas. There is a need for clarification of language precursors of reading and how these function over time. Studies are needed that focus on the three-to-five year age period as this is a critical time for identifying children at risk. Additional research is needed to clarify the interactions among learner characteristics related to reading risk and the interaction between learner traits and instructional methods.

D. Dr. Vera Gutierrez-Clellen, San Diego State University

Dr. Gutierrez-Clellen stated that forty percent of all California students in kindergarten or the first grade are learning English as a second language. Specifically, 80 percent of these children speak Spanish as their first language. Nationally, 30 percent of Hispanic children live in poverty, as compared to 11.2 percent of non-Hispanic white children. These differences are apparent

when Hispanic children enter kindergarten, where they are more likely to score lower than non-Hispanic white children on emergent literacy measures, as well as on math and general knowledge tests.

Differences across schools exist with respect to implementing of bilingual approaches and to classifying children as fluent in English. The choice of test may influence the classification of the student's language skills. Some programs designated as bilingual may not have bilingual teachers, so in many cases the children do not receive formal primary language instruction in academic subjects. There is also no consistent definition of "bilingual education" across programs; few studies have actually examined classroom implementation of variously labeled "bilingual transition" or "immersion" education programs. Further, there is no standard, accepted definition for measuring levels or degrees of bilingualism. Even among children who are designated as "balanced bilinguals" (those with equivalent skills in both languages), examination of children's languages may show differences as to whether they are better in Spanish or English or equal in both. The results may also vary depending on the measures used, as available tests are limited in normative samples and content validity and their focus is limited to proficiency, not use. Dr. Gutierrez-Clellen suggested that it may be more appropriate to consider the years of exposure to English rather than the chronological age of the child when making assessments. There is clearly a need for further research on the specific issues of literacy in young children learning English as a second language.

E. Dr. Hollis Scarborough, Haskins Laboratories

Dr. Scarborough summarized the predictive correlations that have been obtained between developing language and literacy abilities. She also discussed problems in interpreting those findings to construct a satisfactory explanatory model of the relationship. A meta-analysis of data from 61 research samples, revealed that in addition to letter identification and print concepts knowledge, several oral language skills of preschoolers reliably predict future reading achievement. The strongest of these predictors appear to be phonological awareness, sentence/story recall, and expressive (naming) vocabulary skills. Although, on its own, each measure correlates only moderately with outcomes, combining predictors now permits researchers to make quite accurate estimates of risk for reading difficulties for both research and practical purposes.

Other findings from prospective longitudinal research with preschool samples, however, require a more careful examination. Findings from these studies raise challenges to the simple conclusion that oral language weaknesses cause difficulties in acquiring literacy skills or, more narrowly, that most reading disabilities stem from impaired phonological development that impedes the attainment of phonological awareness, and hence the discovery of the alphabetic principle. If such causal chains fully explained the relationship of language development to literacy acquisition, then reading difficulties could be prevented by successfully treating preschool language impairments, such that all children would enter school with sufficient verbal skill to respond well to high-quality literacy instruction. Such attempts have met with only partial success, however. Some have suggested that conventional ways of thinking about the issues may be obscuring a full understanding, and that clues to a more complete theory may be found by considering several unexpected phenomena that have been replicated in research from various disciplines. For instance, correlations with future reading tend to be as strong from age

two-to-four years as from age five; in both individual and group data, future reading disabilities are foreshadowed by deficits in different aspects of language at different ages. Growth of many facets of oral language proceeds nonlinearly (in spurts and plateaus), which permits easier detection of delays in particular skills at some ages than others, and builds to misleading assessments such as "illusory recovery" from a diagnosed preschool language impairment.

Accounting for these and other unexpected phenomena may require at least two changes in thinking. First, instead of unidirectional causal chains, more complex models should be considered in which a persisting, underlying causal factor gives rise to a succession of different risk indicators not necessarily causally related to one another. Second, measurements of preschool language abilities need to take into account the likely nonlinearity of their growth. Efforts in these directions will require additional, theory-driven research on normal and atypical development of language and literacy skills from the early preschool period through the primary school grades.

IV. EMERGENT LITERACY AND INTERVENTION

A. Dr. Barbara Foorman, University of Texas – Houston Medical School

Dr. Foorman addressed the interface of prevention and intervention in literacy attainment. The risk factors for reading problems are apparent at least in kindergarten and first grade. In addition, 88 percent of students who were poor readers in first grade were poor readers in fourth grade. Likewise, 87 percent of students who were good readers in first grade were good readers in fourth grade. Thus, there is stability in reading status from first to fourth grade that is predictable in kindergarten. Moreover, reading problems identified in third grade and beyond are difficult to remedy. Early intervention is effective: one-to-one instruction for students identified as having poor phonological knowledge in kindergarten led to 75 percent of them reading at grade level by second grade.

Conventional regression analyses reveal the significant and unique contribution of vocabulary, rapid naming, letter-sound knowledge, and phonemic awareness to early reading skills. The predictive validity of these skills over time should be assessed, as well as the utility of using these predictors for educators. Diagnosis and assessment of reading difficulties is not typically part of teacher education programs; professional development on this topic is vital so that teachers can assess their students' skills and translate the results into instruction. Early literacy assessment should remain in the control of classroom teachers, rather than becoming part of the "accountability" system that focuses on waiting for failure and then starting intervention. The number of false positives in educational assessment that disappear because of good instruction makes this a particularly salient issue. Regular education teachers and specialists must collaborate on early literacy interventions within the context of regular education.

B. Dr. Angela Notari Syverson, Washington Research Institute, Seattle, WA

Dr. Syverson described results from the Ladders to Literacy Program, a five-year field test of a comprehensive early literacy curriculum. The results indicate that preschool and kindergarten children with a broad range of abilities made gains on various standardized and nonstandardized measures of early literacy, language, and phonological awareness following their participation in

the program. Children presenting delays and children at risk made the strongest gains, while children in a bilingual and biliteracy program (English-Arabic) also showed gains on English language and literacy measures. Variations in activity implementation and teaching strategies were observed among teachers. Teachers who worked primarily with children with mild-to-moderate delays tended to use a broader range of curriculum activities and teaching strategies. Teachers working with children presenting with significant disabilities tended to implement functional activities that fit into daily routines and used more direct teaching strategies.

C. Dr. Joseph Torgeson, Florida State University

Dr. Torgeson summarized the findings of several recent investigations of preventive interventions for children at risk for reading failure. These studies demonstrated that it is possible to bring the reading scores of at-risk children solidly into the average range through properly focused instruction. However, in all the studies reported thus far, a substantial proportion of children (3 to 7 percent of the total population) have remained significantly impaired in critical word reading skills at the conclusion of the intervention. The variables most predictive of difficulties in responding to preventive interventions in reading instruction include weaknesses in phonological ability, high ratings of attentional/behavioral difficulties from classroom teachers, and low parental SES. Either more intensive school-based interventions or earlier interventions may be required to further reduce the proportion of children who experience the kind of early reading difficulties that lead to later school failure.

Continuing research is needed to determine the conditions that prevent early reading difficulties, which may include beginning intervention earlier, using longer interventions, working more intensively with the children, working more skillfully, or using alternative instructional methods for individual children. Research should identify meaningful interactions between child characteristics and instructional approaches. That is, do different children require different methods rather than more or less instruction with the same instructional elements? Studies of this kind require large numbers of participants in order to have sufficient power to achieve statistically meaningful findings.

D. Dr. Susan Goldin-Meadow, University of Chicago

Dr. Goldin-Meadow discussed literacy acquisition in deaf children. In general, reading requires two capabilities: familiarity with a language and understanding the mapping between that language and the printed word. Children who are profoundly deaf are disadvantaged on both counts. Children born to deaf parents in the U.S. are exposed to American Sign Language (ASL) from birth and learn ASL as effortlessly as hearing children learn English. But, ASL has a different syntax, vocabulary, and morphology from English and does not have a written code. Also, 90 percent of deaf children in the U.S. are born to hearing parents. Typically, these children get a late start in learning language. Their parents may communicate with them in a variety of ways through lip-reading, Manually Coded English (a sign language that is structured like English), or more rarely with ASL, but only after the child's deafness has been identified. Moreover, the parents are learning this new communication modality one step ahead of their children.

Given these obstacles, it is not surprising that reading is difficult for profoundly deaf children. On average, many leave high school reading only at the fourth-grade level. However, some deaf

children do manage to read fluently. Studies with these good readers have revealed that they often have knowledge of the sound structure of English despite their inability to hear. The question, however, is whether they gained this knowledge as a function of learning to read, or whether they became good readers as a function of this knowledge. Further, many of the deaf children who become good readers encode into a gestural rather than a phonemic system. Being fluent in ASL also seems to improve the ability to read. Thus, knowing any language, even if it is not the language that is encoded in print, helps a child learn to read. But knowing a language is not enough; reading itself must be taught. The next frontier for reading research in deaf education is to understand how instruction can best be used to turn signers into readers.

E. Dr. Janice Light, Pennsylvania State University

Dr. Light discussed the challenges that literacy development presents for children who have significant speech impairments and require augmentative and alternative communication (AAC), such as gestures, communication boards, voice output communication aids. Children who require AAC are a heterogeneous group with variation in language skills, world knowledge, and motor, sensory, and perceptual skills. While a small number develop high-level literacy skills, most have difficulties and lag behind their peers. Children who require AAC face significant challenges in developing the phonological awareness and language skills that form the foundation for literacy development. There is evidence that individuals who require AAC can develop phonological awareness despite their limited access to speech production; however, most individuals who require AAC demonstrate deficits in this area. Current findings suggest that access to even limited articulatory ability may facilitate decoding, and access to AAC systems with speech synthesis may increase the development of phonological awareness.

Many children who require AAC use graphic symbols (e.g., line drawings, photographs) to express meaning. Use of AAC symbols may facilitate some aspects of early literacy development, such as awareness that print conveys meaning; however, use of AAC symbols may not facilitate other critical aspects of literacy development (e.g., knowledge that letters have different shapes and that letters represent sounds).

Traditionally, little emphasis has traditionally been placed on reading instruction and writing instruction for children who require AAC supports. Their interactions in story reading are qualitatively different from those of their peers. Children who use AAC have significantly less opportunity to learn to construct meaning from stories independently, as their parents and teachers tend to dominate story-reading interactions.

Improving literacy outcomes for children who require AAC is of critical importance because literacy skills enhance their communication effectiveness tremendously and improve their employment options as well. Priorities for future research include investigating factors that influence literacy outcomes, determining the effect of AAC symbol use on the development of early literacy skills, investigating the effect of speech synthesis on the development of phonological awareness and early literacy skills, evaluating the efficacy of interventions to promote phonological awareness and early reading and writing development, and investigating effective strategies to support the transfer of research to practice. As with studies of deaf children, understanding how children who use AAC acquire literacy will provide important insights into literacy learning in general.

F. Dr. Debra Jervay-Pendergrass, Lt. Joseph P. Kennedy Institute, Silver Spring, MD
Dr. Jervay-Pendergrass addressed how infants and toddlers at risk and those with developmental disabilities often experience difficulty in developing language. This situation is of concern since there is a link between oral language and later literacy development. For the very young child, for those from other cultural and linguistic speech communities, and for those with disabilities, the oral-to-literate continuum may be extended to include other precursor skills, such as prenarratives.

All children have stories to tell and a need to share them. With the help of willing listeners, these child-initiated "prenarratives" or first stories produced verbally and/or visually in natural day-to-day interactions can become teachable moments. Dr. Jervay-Pendergrass's preliminary investigation of the genesis of narrative production identified prenarrative talk, and isolated a class of distinct linguistic features called "narremes" produced by very young children in their day-to-day interactions with peers and adults in a child care setting. The STORIES (**S**tories **T**old by young children with disabilities, **O**bserved and fostered by **R**ecipients in **I**nclusive settings promoting **E**arly language and literacy skills that is culturally **S**ensitive) project is translating this research into a culturally and linguistically rich, story-based program model.

The STORIES Project is a model demonstration research-to-practice project, funded by the Department of Education, Office of Special Education Programs. The project is aimed at increasing caregiver awareness and improving recognition of prenarratives and of the different ways young children communicate their stories. It also encourages parents and caregivers of children who are African American, Hispanic, and deaf to begin to use these child-initiated stories to build language and facilitate early literacy skills in young children at risk for/with developmental disabilities in inclusive childcare environments.

V. SUMMARY AND CONCLUSIONS

Dr. Nickola Nelson, Western Michigan University
Dr. Nelson summarized four basic themes of the workshop – models, tools, questions, and gaps. Models need to be developed and modified; they should be comprehensive, and should take into account that effects may not be linear, but may occur as spurts and plateaus. They should also account for the fact that the difficulty of tasks may vary across groups being studied. Models should be designed to factor in interventions as well as intrinsic qualities of children.

A variety of tools, both old and new, are available, which allow researchers and educators to address research questions. As Dr. Pugh noted, however, "Our tools are no better than our questions." Questions should be broad enough to be relevant but narrow enough to allow the design of focused studies. When selecting tools, measurement questions should consider what to measure (both intrinsic and environmental variables), how to measure (using both static and dynamic, accepted and new techniques), why to measure (both to understand phenomena and to effect change), when to measure (cross-sectional and longitudinal, at early points and at various points in preschool development), who to measure (diverse populations), and where to measure (homes, preschool settings, clinical laboratories).

A number of analytical methods and study designs are available for considering univariate and multivariate effects. In analyzing the data, researchers and practitioners must remain mindful that correlation is not equivalent to causation. Further, they should recognize that statistical significance may not define educationally meaningful outcomes. Studies that both explore the developmental trajectory of emergent and early literacy over the preschool years (from birth to kindergarten) and consider the context and environment are needed.

Based on the workshop presentations, participants were asked to identify knowledge gaps in the areas of identification, prevention, and intervention. From these gaps, a research agenda has been developed, which is presented in Section VI of this document.

One theme of the workshop was primary prevention: the practices that contribute to establishing skills that will provide a solid basis for the development of literacy, and those that will help to prevent reading difficulties. One prevention priority is enthusiastic support during preschool and later during the educational process for reading and literacy skills. For children to attain the automated processing that is needed for good reading skills, teachers must allocate sufficient attention in preschool and primary elementary grades for reading and literacy activities. Rather than waiting for failure, it is important to prime children with specific types of knowledge, to prepare them for reading and writing success.

Another important fact to consider is that there is no one-size-fits-all solution for either preventing or remediating reading difficulties; this is just as true for the experiences of children in the preschool years as it is for instruction and intervention for school-aged children. Nonetheless, there are some types of experiences which, while they may differ in their implementation for various developmental periods or various cultural groups, should be provided to all children. These include book reading, language play (e.g., rhyming, sound play, and vocabulary development), and early experience with "writing." Such experiences should occur in multiple environments and can be provided by family members, childcare workers, preschool teachers, librarians, and others.

Identification research is also needed to clarify the variables at various times during development that predict or identify individual differences in literacy development. Additional research on the nature of literacy learning difficulties will inform identification activities and add to the knowledge base underlying both prevention and intervention. Interaction between early identification and early intervention is vital to ensure that factors studied in one, inform studies of the other. Again, this research should incorporate the understanding that there is no one-size-fits-all solution.

Overall, there was strong agreement on the need for large-scale longitudinal studies of emergent and early literacy to (1) describe and explain more fully the nature, time course, and underpinnings of language and literacy development and (2) determine the optimal environments and experiences that will foster reading success and prepare our preschool children for the kindergarten literacy experience. All participants agreed that a combination of methods is needed to produce empirical evidence that is also enriched with qualitative information on contexts and cultural factors; further, all aspects of such studies must be well-designed and methodologically rigorous. Such research should adopt a developmental focus, recognizing that

how early literacy experiences are provided may differ according to a child's current level of knowledge and skill at different points in the preschool and early school years. In addition, researchers should modify approaches to address different contexts or settings such as the home, an individual childcare setting (provided by relative or not), and so forth. The child's special needs are also important; clearly those speaking languages other than English, those unfamiliar with the so-called "standard" dialect of English, those using ASL, and those using AAC devices or with other disabilities will require special considerations.

VI. RESEARCH AGENDA AND SUGGESTIONS FOR PRACTICE

A. Research Agenda

The following section describes the areas identified as priorities for future research on emergent and early literacy. There is not only a great need, but a tremendous opportunity for creative, innovative research. The first set of items frame key questions regarding the development of literacy skills and the early identification, prevention, and remediation of reading and writing difficulties. The remaining items highlight more general considerations that investigators must take into account when designing and conducting research on such questions.

Key Research Questions:

- In-depth longitudinal studies of emergent and early literacy skills are needed to identify children at risk for reading difficulties. Such studies will also provide an empirical basis for prevention and intervention programs for preschoolers and for targeted training and information dissemination programs for early childhood educators, childcare workers, and family members.
  - More information is crucially needed as to which variables at various early preschool developmental levels predict reading differences (and identify children at risk for reading difficulties) at subsequent points in literacy acquisition, especially kindergarten and beyond. A wide range of theoretically relevant variables should be considered, including but not limited to the cognitive and linguistic abilities that appear promising in extant research with young preschoolers.
  - Such research is needed to determine the precursors of kindergarten-age differences in letter knowledge, print concepts, phonological awareness, vocabulary, and story recall skills, and whether such early indications of risk can be reliably measured and used for early identification. Influences of learning characteristics such as motivation, persistence, and responsiveness need to be explored, both alone and in interaction with skill differences, during early literacy acquisition.
  - The roles of neurobiological factors, home environment (e.g., literacy exposure, home language), and preschool experiences also require further study. Predictive longitudinal studies are especially needed for children who are not native English speakers and for children who have significant motor, speech, and/or sensory impairments.
  - Research addressing these issues should be collaborative, involving multiple disciplines and perspectives. Both short-term and especially long-term outcomes should be examined, and outcome assessments should include measures of multiple components of

literacy skill, including comprehension, letter/word recognition, spelling, fluency, and writing.

- A developmental language impairment is the most frequently identified individual difference or deficit observed during the preschool years that has been linked to subsequent reading difficulties. What is the nature of the relationship between language impairments and reading disability? Is there a direct causal relationship, are these two conditions manifestations of a common underlying factor, are they co-morbid disorders, or might more than one relationship between them obtain in different subgroups? Which aspects of early language impairment (express/receptive, phonological, syntactic, lexical, etc.) are associated with the greatest risk for poor future reading achievement?

- Current knowledge about early identification of children at risk for reading difficulties should be applied in various contexts in the preschool period and in kindergarten. Research should examine identification – intervention interactions and determine what factors need to be in place to assure reliable and accurate prediction. What are the consequences, if any, of false-positive risk identifications? Can the rate of such prediction errors be reduced through refinement of assessment instruments and methods?

- Large-scale intervention research is needed to determine the earliest time for effective intervention, the optimal intensity of intervention, the appropriate length of intervention, the necessary skill-level of intervenors, the best candidates for that role, and the best delivery methods (e.g., small groups or one-on-one). There is also a need for longitudinal studies of long-term adaptive interventions with multiple outcome measures across language and literacy domains, as well as for longitudinal studies that begin with preliteracy intervention and end with comprehensive literacy outcomes that document the developmental trajectory. These studies should consider the needs of diverse populations, including children who are not native English speakers, those who use AAC, and those who use ASL. Studies are also needed to determine the nature of effective interventions with parents for children with different risk factors, including children with special needs.

- Intervention research is needed on the effects of various learner characteristics on adult and peer perceptions. What are the consequences of such perceptions for instructional/classroom practices and interactions for interventions? Children who are, or are judged to be, less cognitively able or less verbally skilled may be perceived as socially immature, may elicit less caregiver attention, may have more difficulty forming relationships (both with peers and with caregivers), and may benefit less than other children from literacy interventions involving group activities or peer interactions.

- What is the optimal behavior of parents and kinship childcare givers in providing in-home emergent and early literacy experiences for children? What types of activities and family interactions best foster growth in literacy at various points during the preschool years? How can early literacy experiences be supported for parents who possess less than optimal literacy skills themselves? How can parents of children with special needs support the literacy development of their children?

- What are the necessary and optimal characteristics and training of educators for preschool children? How should educators and paraprofessionals be trained? What content should they be master? Can high turnover rates among early childhood educators be reduced through increased preservice training and ongoing opportunities for support? Can materials and technological solutions provide continuity of intervention in the face of high mobility of both children and educators in many preschool settings? How do preschool educators view their roles in promoting early literacy and preparing young children for kindergarten entry?

General Research Considerations:

- Research on early literacy issues must study diverse populations. There is also a need to examine the academic disparities among racial and ethnic minority groups, including those correlated with differences in culture, dialect, and home language. In addition, researchers must differentiate the impact of SES from racial, ethnic, and linguistic differences. Research should examine the unique challenges that early literacy development poses for children who use AAC or ASL.

- Valid and informative measures of child, home and curriculum variables are needed for both identification and assessment. Even though a variety of measurement tools are now available, these assessments must be appropriate to the research questions being addressed; further, these measures must be adaptable to address new or changing research questions. Measures must be broad enough to be relevant, yet narrow enough to accommodate optimal study design; dynamic as well as static approaches should be adopted. In addition, valid, easy-to-use screening instruments should be available for non-professionals to further the efforts of identification and assessment. A pressing need also exists for developing valid and reliable measures that can be used to assess children with significant speech, motor, visual and hearing impairments, children who speak nonstandard dialects, and children who are not native speakers of English.

- Researchers, commercial developers, and educators need to crease age-appropriate, engaging, and innovative curricula and materials for early literacy intervention, based on research findings. These programs and materials should address specific developmental levels, allow for different styles of teaching without loss of fidelity, and consider the accommodations necessary to effectively meet the unique needs of children who use AAC and ASL, as well as children from different cultural and linguistic backgrounds. Any new curriculum or material development plan should include a clear, well-defined assessment plan, in addition to professionally conducted training and ongoing support.

- In planning studies of early literacy, researchers should incorporate, when appropriate, recently developed, innovative study designs and sophisticated analytical methods. Various means are now available to examine complex univariate or multivariate effects, while novel approaches to the measurement and analysis of change over time are constantly under development. Use of these techniques will likely require cross-disciplinary collaboration, which could enhance research in this area overall.

- New theoretical accounts of emergent and early literacy must be developed, and current models modified. Such accounts must be comprehensive, taking into account that developmental progress may not be linear, but rather occur as spurts and plateaus, and that the sensitivity of assessments may vary accordingly. Models must also consider emergent and early literacy in children with special needs, including children who require AAC, those who use ASL, and those who are bilingual.

- Brain development should be considered in the design of research. The period that coincides with development of emergent and early literacy is a period of significant brain development. The way in which researchers formulate variables is not necessarily mirrored in brain organization. It is important to investigate, for example, whether areas of the brain that are identified as producing anomalous activity during reading in older individuals are common to other types of cognitive activities or are specific to literacy. As neuroimaging technologies improve, use of these procedures at younger ages is becoming more feasible and should allow investigation of such issues. Neuroimaging performed on children with special needs, such as those who are deaf or those with significant speech and physical disabilities, may provide new and important insights into the process of literacy learning.

B. Suggestions for Practice

Workshop participants also agreed that, while we must push forward with additional research in emergent and early literacy, there is some available knowledge that has implications for current practice. These implications include the following suggestions.

- Early childhood educators, childcare providers, and special service providers need specific preparation in child development related to emergent and early literacy. They should know the milestones and characteristics of normal child development and language development, as well as knowing what specific experiences are valuable in promoting emergent and early literacy skills. Such information should also be made available to parents and kinship caregivers. For example, attending to children's earliest verbal and nonverbal prenarratives helps them learn to communicate through connected discourse; reading to children gives them familiarity with the concept of print, how to hold a book, and following a story line. Handwriting is also an important literacy skill; the opportunity to draw and color helps children to develop the necessary motor skills for grasping pens and pencils to write. Those working and interacting with young children should also be aware of culturally appropriate practices in emergent and early literacy; this knowledge should include information about accommodations required to support children with special needs, including those with significant motor, speech, and/or sensory impairments.

- Quality teaching and learning resources should be readily available childcare providers, childcare organizations, early childcare educators, and special service professionals and paraprofessionals. Libraries and local organizations often provide guidelines for enhancing early literacy experiences, along with free materials and activities. Some pediatricians guide parents to early literacy enrichment materials and refer for special services when they identify risk factors; more could learn to do so.

- Members of interdisciplinary teams should provide assessment of children's skills, and should recommend specific individualized preventive and facilitative activities. The importance of monitoring children considered to be at risk should be emphasized.

- Research should identify effective approaches/methods from exemplary programs and preschools, especially those programs that are successful in the face of adversity and those that are successfully accommodating children with special needs. Educators should study these programs to allow for adaptation and application to more general early childhood and primary grade settings, with well-planned evaluation of such modified programs included as a standard feature.